

Amphibia, Anura, Hylidae, *Hypsiboas raniceps* Cope, 1862: Distribution extension

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ABSTRACT: *Hypsiboas raniceps* is a large treefrog typically found in the Cerrado and Caatinga biomes. Here we provide information about new records of this species in the Atlantic Forest and raise some hypotheses that could explain the late record of this species in this biome.

Hypsiboas raniceps Cope, 1862 (Figure 1) is a large Neotropical hylid frog commonly found in the Cerrado and Caatinga biomes (Arzabe 1999; Guimarães and Bastos 2003), being the most widespread species of the *Hypsiboas albopunctatus* group. Besides occurring in central and northeastern Brazil, *H. raniceps* also inhabits the Brazilian Amazon Basin, south Colombia, north French Guiana, Amazonian Bolivia, Paraguay, and northeastern Argentina (Frost 2009).

Although *H. raniceps* is known to occur in tropical forests, such as the Amazonia (Heyer 1977), there are no records in the Atlantic forest of southeastern Brazil, or any coastal region in the south or southeast part of the country.

We recorded *H. raniceps* in calling activity in temporary ponds and artificial lakes in pasture areas close to the Parque Estadual Campina do Encantado, municipality of Pariquera-Açu (24°38'44.8" S, 47°48'39.9" W, 21 m a.s.l.), Atlantic forest of the state of São Paulo, southeastern Brazil, at about 20 km from the coast (collecting permits provided by Instituto Brasileiro do Meio Ambiente e Recursos Naturais Renováveis – IBAMA 168/2006). The geographic distribution of *H. raniceps* is thus extended by 436 km southeast from the nearest point in the state of São Paulo (Nova Itapirema; Vasconcelos and Rossa-Feres 2005) and its altitudinal distribution now ranges from the minimum of 21 m above sea level. Specimens housed in herpetological collections of the state of São Paulo (Universidade Estadual de Campinas [ZUEC], Museu de Zoologia, Universidade de São Paulo [MZUSP], Coleção Célio Fernando Baptista Haddad [CFBH] and Universidade Estadual Paulista, campus São José do Rio Preto [DZSJRP]) indicate that *H. raniceps* occurs in areas closer to Pariquera-Açu than Nova Itapirema, such as Atibaia (23°12' S, 46°56' W, 803 m a.s.l.) (DZSJRP 4081 and 4082), reducing the geographic range presented above to 220 km southeast. Data available in those collections and in the literature indicate that this species is commonly found in coastal areas of northeastern Brazil (e.g. Recife, state of Pernambuco [ZUEC-AMP 377];

Propiá, state of Sergipe [ZUEC-AMP 8694]; Teixeira, state of Paraíba [ZUEC-AMP 8758]; João Pessoa, state of Paraíba [Santana *et al.* 2008]; Figure 2).

The Atlantic forest is Brazil's most fragmented biome, due to deforestation (Morellato and Haddad 2000). However, some good quality patches are preserved as conservation unities, such as the Parque Estadual Campina do Encantado (São Paulo 1998). According to Haddad and Sazima (1992), some anuran species benefit from forest fragmentation by spreading their geographic ranges. Additionally, habitat fragmentation increases the vulnerability of the fragments to invasion by allochthonous and native species that occupy adjacent open areas (Paton 1994; Haddad and Prado 2005).

Although this new record for *H. raniceps* does not greatly extend its geographic distribution, the major contribution of our data is the record of the species in Atlantic forest areas in the state of São Paulo. There are three possible explanations for the new record of *H. raniceps* in the Atlantic forest: 1) the region may represent one of the extremes of the species' distribution range, where it was never registered before; or 2) during the Pleistocene glaciation the species may have occupied areas that currently



FIGURE 1. A male *Hypsiboas raniceps* calling in the margin of an artificial lake in Pariquera-Açu, state of São Paulo, southeastern Brazil.

correspond to Atlantic rainforest areas (refuge theory, Haffer 1969; Vanzolini and Williams 1981), which could also explain its occurrence in the Atlantic rainforest of northeastern Brazil; or 3) the species is expanding its distribution range due to deforestation of the Atlantic forest.

The third alternative seems to be more plausible, since *H. raniceps* was collected in pastures, and also justifies its occurrence in coastal areas of northeastern Brazil, where the deforestation of the Atlantic forest is known since the XVI Century. However, we cannot reject the first hypothesis, as the number of surveys and publications is still

insufficient, considering the high diversity of anurans in the Atlantic forest. Phylogeographical studies could provide valuable information about the current and past demographic history of *H. raniceps*. Additionally, statistical modeling methods may be used as a complementary tool to understand how the environment correlates with species distribution patterns (Giovanelli et al. 2010). These approaches are fundamental not only to determine the geographical extension of particular species and event(s) responsible for it but also to elucidate the history of biomes.



FIGURE 2. Map showing the new localities where *Hypsiboas raniceps* was recorded. Circles indicate new records obtained from herpetological collections and from the literature on anuran communities for northeastern Brazil. The triangle represents our new record from Pariqueira-Açu, state of São Paulo, southeastern Brazil.

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